

What is claimed is:

1. An image processing method comprising the steps of:  
generating object regions by dividing an image into  
objects, and generating a plurality of block regions each having  
5 a predetermined number of pixels and having a smaller area than  
any one of the object regions by dividing the image;

recognizing the types of the respective block regions;  
totaling up occurrence frequency of each of the types of  
the respective block regions in each of the object regions; and  
10 recognizing the type of each of the object regions based  
on a result of the totaling.

2. The image processing method according to Claim 1,  
further comprising the steps of:

calculating a type reliability value representing  
15 likelihood of each of the object regions being of the recognized  
type:

setting an image processing condition for each of the  
object regions by using the type reliability value and the type  
thereof; and

20 carrying out image processing on each of the object  
regions by using the image processing condition.

3. An image processing apparatus comprising:

object region extraction means for generating object  
regions by dividing an image into objects;

25 block region generation means for generating block

regions each having a predetermined number of pixels and having a smaller area than any one of the object regions, by dividing the image;

block region recognition means for recognizing the types  
5 of the respective block regions; and

object recognition means for recognizing the type of each of the objects by totaling up occurrence frequency of each of the types of the block regions in each of the object regions.

4. The image processing apparatus according to Claim 3,  
10 wherein the block region recognition means comprises:

block characteristic quantity extraction means for extracting block characteristic quantities from each of the block regions;

mapping means for mapping the block characteristic  
15 quantities into a two-dimensional space; and

type output means having a type distribution map that defines the types at respective coordinates in the two-dimensional space, the type output means for outputting the types indicated by the type distribution map at coordinates of  
20 the block characteristic quantities mapped in the two-dimensional space as the types of the block regions.

5. The image processing apparatus according to Claim 3, wherein the two-dimensional space is a self-organizing map wherein neurons having a learning ability are laid out in the  
25 form of a matrix.

6. The image processing apparatus according to Claim 3,  
wherein the block characteristic quantity extraction means  
extracts a color component, a lightness component, and a  
structural component of each of the block regions as the block  
5 characteristic quantities.

7. The image processing apparatus according to Claim 3,  
wherein the object recognition means has a function of  
calculating a type reliability value representing likelihood  
of each of the object regions being of the recognized type, and  
10 wherein the image processing apparatus further comprises:

processing condition setting means for setting an image  
processing condition for each of the object regions by using  
the type reliability value and the type thereof found by the  
object recognition means; and

15 image processing means for carrying out image processing  
on each of the object regions by using the image processing  
condition set by the processing condition setting means.

8. The image processing apparatus according to Claim 7,  
wherein the processing condition setting means sets the image  
20 processing condition by calculating a processing efficiency  
coefficient that depends on the type reliability value and by  
multiplying an initial image processing condition set for each  
of the types of the object regions by the processing efficiency  
coefficient that has been calculated.

25 9. The image processing apparatus according to Claim 7,

wherein the object recognition means recognizes a category representing whether each of the object regions is an artificial object region comprising an artificial image or a natural object region comprising a natural image, and calculates a category  
5 reliability value representing likelihood of each of the object regions belonging to the category, in addition to the type reliability value.

10. The image processing apparatus according to Claim 9, wherein the processing condition setting means sets the image  
10 processing condition for each of the object regions by using the type reliability value and the category reliability value, in the case where the image comprises the artificial object region and the natural object region.